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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,458	04/13/2004	Rajesh Menon	MIT.10379	4712

7590 07/26/2005

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EXAMINER

HASHMI, ZIA R

ART UNIT	PAPER NUMBER
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2881

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/823,458

Applicant(s)

MENON ET AL.

Examiner

Zia R. Hashmi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-20 are rejected under U.S.C. 103(a) as being unpatentable over Veneklasen et al. (5,847,959), in view of Ashton et al. (5,051,598).

3. With respect to independent claims 1 and 11, Veneklasen et al. disclose a method and system for providing error correction in an imaging system (Abstract, lines 4-9), the system comprising: error determination means for determining an amount of error associated with a spot at (x,y) in a binary pattern to be imaged (col. 1, lines 15-24, 33-34, & 48-55, 140 in Fig. 2 & 340 in Fig. 7); determination means for determining the location of a nearest exposed spot at (xi, yi) for each spot (x,y) (col. 3, lines 50-53, col. 4, lines 24-27, col. 5, lines 35-43, and equation 1); and dose modification means for modifying an exposure dose (Abstract, lines 4-16, col. 3, lines 53-67, col. 4, lines 1-4, and col. 10 & 11, claim 1). It is understood that if a spot can be given a set of coordinates (x,y), then the nearest exposed spot can be given a different set of coordinates, say (xi,yi), and the meaning of binary pattern carries the conventional meaning, namely that a substrate provides distinctly clear and dark regions of a pattern.

4. With respect to independent claims 7 & 17, and dependent claim 4, Veneklasen et al. further disclose a method and system for providing error correction in a

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lithographic imaging system, the system comprising: exposed pattern simulation means for simulating an exposed pattern of a binary pattern to be imaged; thresholding means for determining a thresholding pattern by applying a thresholding function to the exposed pattern; error determination means for determining an amount of error associated with a spot at (x,y) in a binary pattern to be imaged corresponding to a difference between the thresholding pattern and the binary pattern; determination means for determining the location of a nearest exposed spot (xi,yi) for each spot (x,y), and dose modification means for modifying an exposure dose at the nearest exposed spot at (xi, yi) for each spot at (x,y) (col. 5, lines 16-33, col. 6, lines 23-61, and Fig. 3).

5. With respect to dependent claims 2 and 8, Veneklasen discloses a system wherein the error determination means includes determining a convolution of the pattern to be imaged with a point spread function (col. 5, equation 2, lines 66-67, col. 6, lines 5-13, equation 2.1, col. 7, lines 1-8, col. 8, lines 1-6, 230 in Fig. 3, and Fig. 4A & 4B).

6. With respect to independent claims 1, 3, 5-7 and 9-20, Veneklasen et al. fail to disclose specifically dose modifications means for modifying an exposure dose at the nearest exposed spot for each spot. Ashton et al., however, disclose such dose modifications means for correcting exposure dose at the nearest exposed spot (xi,yi) for each spot (x,y) (Abstract, lines 1-17, col. 6, lines 3-5 & 20-46, col. 9, lines 44-67, col. 17, claim 1, and Fig. 2).

It would have been obvious to one having ordinary skill at the time of the invention was made to combine the methods and apparatus of Veneklasen and Ashton

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et al., because Veneklasen et al. teach (col. 1, lines 48-51) that correction of errors due to proximity effects is an important aspect of electron beam lithography, heightened by the trend to smaller geometries with increasingly complex patterns requiring greater precision and accuracy.

Conclusion

7. Van Dyck et al. disclose (6,920,368) a method and device for correcting proximity effects based on precompensated pattern of exposure doses of an electron beam required per pattern position, to obtain a desired pattern.
8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact Electronic Business Center (EBC) at 866-217-9197 (toll-free).
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zia Hashmi whose telephone number is (571) 272-2473. The examiner can normally be reached between 8.30 AM- 5 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477.

Zia Hashmi

July 20, 2005


JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800